
XI. *Observations on the Flowering of certain Plants.* By the Rev. Thomas Martyn, B.D. F.R.S. V.P.L.S. Regius Professor of Botany in the University of Cambridge.

Read July 4, 1797.

THE improvements in the physiology of plants, since the days of Malpighi and Grew, have by no means kept pace with those which have been made in the nomenclature, and in the ascertaining of genera and species by accurate characters, descriptions and figures, under Linnæus and his followers. The reason is obvious: in order to ascertain a plant, it is only necessary to see and describe it once or twice in its state of greatest perfection; but we are not likely to become acquainted with the internal structure and functions of vegetables, till a series of accurate experiments shall have been gone through; or with their life, actions and manners, if we may so speak, till we have got together a fund of laborious researches and observations. And there are very few persons who can sacrifice all the numerous calls of business or pleasure, to bestow a constant and regular attention to one object, and to become almost as stationary as the plants they are observing. Even the following observations, which are almost too trifling to offer for the consideration of the Linnæan Society, required a regular attention several repeated times morning and evening during upwards of six weeks.

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The three plants (*Anagallis arvensis*, *Oenothera biennis*, *Hibiscus trionum*) which were selected for these observations, were taken rather for the convenience of their situation, from their vicinity to the house, than for any other reason. *Anagallis arvensis*, however, is a delicate wild plant, that has long since attracted notice, as indicating rainy weather or a moist atmosphere by the closing of its flowers, and the contrary by their opening. Hence its name among the country people, of *Shepherd's* or *Poor man's weather-glass*. And *Oenothera biennis* has been generally regarded, from an early period, for the regular opening of its flowers in the evening; and has thence obtained the name of *Evening* or *Nightly Primrose*.

The flowers of the *Oenothera* are collected in a very close corymbus at the top of the stalk till the time of flowering. The upper flowers expand first; and as they expand successively, the stalk is advancing in height, and separating the flowers; infomuch that when the flowering time is past, there is the space of a foot or eighteen inches interposed between those flowers which were originally contiguous. Whilst each flower is preparing for expansion, the peduncle gradually diverges from the stem, and, before the flower opens, arches downwards like a swan's neck: the corolla swells out at bottom, and is very apparent there between the leaflets of the calyx, which keep it close together for a considerable time at top, by means of the hooks at the extremity of the calycine leaflets, till at length the corolla bursts its bonds instantaneously, opens to a certain point, and then having made a stand for a few seconds, expands very slowly to its full extent. This critical moment is very interesting to the botanical observer, and may be seen with ease and pleasure between six and seven within the house, by gathering the flowers and setting them in water. In hot weather the flowers

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grow flaccid, and wither before noon the next day; but in cool and cloudy weather they will last two days.

The flowers of *Hibiscus trionum*, when once expanded, continue open till they close finally. They then droop; and when the corolla is withered and fallen, the peduncle again becomes erect. In warm weather the corolla folds up wholly at night, and decays on the second day; but in cool weather it will last a day or two half folded up, but never opening so as to show the rich purple eye at its base.

The height of the barometer and thermometer, with the state of the weather on each day, are given with a view of ascertaining whether there be any connection between them and the time in which the flowers open.

The barometer was observed between 8 and 9 A. M. and the thermometer at the same time, and again about 3 P. M. The latter instrument was within the house, but in a hall, the door of which was commonly open, and not at all exposed to the sun.

Observations on the Opening and Closing of the Flowers of Anagallis arvensis, Oenothera biennis, Hibiscus trionum, &c. during the Autumn of 1796.

	<i>Barom.</i>	<i>Therm.</i>	<i>Weather.</i>	<i>Observations.</i>
Aug. 16.	29 $\frac{1}{10}$	66°	Dry, sunshine and clouds alternately. Wind N. E.	<i>Hibiscus trionum</i> open from 8 to 4.
17.	29 $\frac{0}{10}$	61 to 64	The same, only more cloudy.	<i>Hibiscus trionum</i> open from 8 to 4.
18.	29 $\frac{1}{10}$	61 to 64	The same, morning covered.	<i>Hibiscus trionum</i> open from 10 to 4.
19.	29 $\frac{7}{10}$	62 to 66	The same, but warmer.	<i>Hibiscus trionum</i> open from 9 to 4.
20.	29 $\frac{7}{10}$	62 to 68	Fog, soon cleared, hot.	<i>Hibiscus trionum</i> open from 9 to 4.
21.	29 $\frac{6}{10}$	64 to 70	Clear, hot. Wind E.	<i>Hibiscus trionum</i> open from 8 to 4.
22.	29 $\frac{1}{10}$	64 to 71	The same.	<i>Hibiscus trionum</i> open from 8 to 4.

	<i>Barom.</i>	<i>Therm.</i>	<i>Weather.</i>	<i>Observations.</i>
Aug. 13.	29 $\frac{7}{8}$	65 to 71	Clear, hot. Wind E.	Anagallis arvensis open from 9 to 3. Apargia hispida closed at 12. Hibiscus trionum 8 to 4. Anagallis arvensis 10 to 3. Apargia hispida 8 to 12. Hibiscus 8 to 3.
24.	29 $\frac{7}{8}$	63 to 70	The same.	Anagallis 10 to 3. Oenotherabiennis open at 7 p.m. Bellis perennis shut at 7 p.m. Hibiscus 8 to 2 $\frac{1}{2}$.
25.	29 $\frac{6}{8}$	63 to 68	Fog, cleared before 10. Wind S. W.	Anagallis 10 to 2. Oenothera 7 p.m. open. Bellis 7 p.m. shut. Hibiscus 8 to 4.
26.	29 $\frac{7}{8}$	65 to 69	Light clouds and airs. Wind S.W. Great clouds at noon, announcing a distant storm. Flowers not affected by it. Afternoon very cloudy, with a sprinkling of rain. Heavy rain and wind at night.	Anagallis 10 to 2. Oenothera 7 p.m. open. Bellis 7 p.m. shut. Hibiscus 8 to 4.
27.	29 $\frac{0}{8}$	63 to 71	Wind N. N. W. Cloudy with sunshine. Windy afternoon. A shower at 2 P.M.	Anagallis 9 $\frac{1}{2}$ to 2. Oenothera 6 p.m. open. One flower of Hibiscus not shut at 6 p.m.
28.	29 $\frac{6}{8}$	61 to 63	Windy, clear morn, N. W. Cloudy at 10. Very cloudy the rest of the day, Wind N. Evening clear.	Hibiscus 9 $\frac{1}{2}$ to 4. Anagallis half open at 12, quite open at 1, closed before 2. Oenothera 7 p.m. open Hibiscus open 9 to 5. Anagallis 8 to 3. Oenothera 7 p.m. open. Some flowers of Hibiscus not finally closed at 7.
29.	29 $\frac{1}{8}$	60 to 62	Wind N. Light clouds and flying showers. N. E.	Hibiscus 9 $\frac{1}{2}$ to 4. but never fully opened. Anagallis not open. Oenothera 7 p.m. open. Flowers of the 27th only flaccid; of yesterday contracted, but not flaccid.
30.	29 $\frac{6}{8}$	61 to 62	Wind N. E. Cloudy, windy. Rain at 2. Afternoon and evening wet.	Hibiscus 9 to 4. Anagallis 11 to 1, but never perfectly expanded. Oenothera 6 $\frac{1}{2}$ open. Flowers of the 28th not withered till 9 a.m. this day. Hibiscus and Anagallis not open. Oenothera 6 $\frac{1}{2}$ open.
31.	29 $\frac{6}{8}$	60 to 61	Wind E. covered. Windy with some wet.	Hibiscus 9 $\frac{1}{2}$ to 4. Anagallis 12 to 2. Oenothera 7 p.m. open.
Sept. 1.	29 $\frac{7}{8}$	60 to 62	Wind N. W. Clear with some flying clouds and wind. More cloudy towards afternoon.	
2.	29 $\frac{1}{8}$	59 to 62	Sunshine, with white clouds, Wind E. N. E. Dry all day.	

	Barom.	Therm.	Weather.	Observations.
Sept. 3.	29 $\frac{7}{10}$	59 to 63	Sunshine, with white clouds, Wind N. W. Fine weather with much sun till evening; then very cloudy. Gentle rain in the evening.	Hibiscus 9 to 4 $\frac{1}{2}$. Anagallis only half open at noon. Oenothera 6 p. m. open. Hibiscus 9 $\frac{1}{2}$ to 5. Anagallis 11 to 3. Oenothera 7. p. m. open.
4.	29 $\frac{5}{10}$	60 to 62	Gentle rain in the morning. Wind W. N. W. Cloudy all day and warm.	Hibiscus 9 $\frac{1}{2}$ to 5 $\frac{1}{2}$. Anagallis half open at noon for a little time. Oenothera 6 $\frac{1}{2}$ p. m.
5.	29 $\frac{11}{10}$	60 to 62	Wind W. Covered, with heavy clouds. Sun appeared about 1, and the afternoon continued fair.	Hibiscus 10 $\frac{1}{2}$ to 6 $\frac{1}{2}$, but never fully open. Anagallis 11 to 2, but not quite open. Oenothera 7 p. m.
6.	29 $\frac{5}{10}$	60 to 63	Wind W. Covered, windy. Afternoon very cloudy, with strong wind.	Hibiscus 9 $\frac{1}{2}$ to 4 $\frac{1}{2}$. Anagallis 10 to 2 $\frac{1}{2}$. Oenothera 7 p. m.
7.	29 $\frac{7}{10}$	61 to 63	Wind W. Heavy rain in the morning; afterwards fair; evening very clear.	Hibiscus 12 to 6. Anagallis 1 $\frac{1}{2}$ to 3. Oenothera 7 p. m.
8.	29 $\frac{5}{10}$	59 to 71	Clear sunshine. Wind W.	Hibiscus 9 $\frac{1}{2}$ to 6. Anagallis 10 to 3. Oenothera 6 p. m.
9.	29 $\frac{6}{10}$	62 to 66	Covered, but sun appears before 10. Wind W. Clouds.	Hibiscus 8 $\frac{1}{2}$ to 5. Anagallis 10 to 3. Oenothera 6 p. m.
10.	29 $\frac{11}{10}$	62 to 68	Morning clear sunshine. Wind S. W. Cloudy. Evening covered.	Hibiscus 8 $\frac{1}{2}$ to 4 $\frac{1}{2}$. Anagallis 9 $\frac{1}{2}$ to 3. Oenothera 6 $\frac{1}{2}$ p. m.
11.	29 $\frac{11}{10}$	65 to 67	Wind S. W. Covered. A shower. Clear at noon and the whole day after.	Hibiscus 8 $\frac{1}{2}$ to 5 $\frac{1}{2}$. Anagallis at 10 $\frac{1}{2}$ half open. Quite open from 12 to 3. Oenothera 6 $\frac{1}{2}$ p. m.
12.	29 $\frac{7}{10}$	63 to 67	Wind W. S. W. White clouds. Heavy clouds at noon. Fair all day.	Hibiscus 8 $\frac{1}{2}$ to 5. Anagallis 9 $\frac{1}{2}$ to 2 $\frac{1}{2}$. Oenothera 6 $\frac{1}{2}$ p. m.
13.	29 $\frac{7}{10}$	61 to 68	Wind S. W. Strong dew. Morning clear; cloudy before 10. White clouds all day.	Hibiscus 8 $\frac{1}{2}$ to 5 $\frac{1}{2}$. Anagallis 10 to 2 $\frac{1}{2}$. Oenothera 6 $\frac{1}{2}$ p. m.
14.	29 $\frac{6}{10}$	63 to 69	Wind W. S. W. Heavy clouds and sunshine.	Hibiscus 8 to 4 $\frac{1}{2}$. Anagallis 9 $\frac{1}{2}$ to 2 $\frac{1}{2}$. Oenothera 6 $\frac{1}{4}$ p. m.
15.	29 $\frac{5}{10}$	65 to 68	Wind W. S. W. Heavy clouds and wind. Fair all day.	Hibiscus 8 $\frac{1}{4}$ to 4. Anagallis 9 $\frac{3}{4}$ to 2 $\frac{3}{4}$. Oenothera 6 $\frac{3}{4}$ p. m.
16.	29 $\frac{6}{10}$	66 to 68	Wind W. S. W. Covered. Heavy clouds with some wind. Fair all day.	Hibiscus 8 to 5. Anagallis 9 to 2. Oenothera past 7.
17.	29 $\frac{11}{10}$	64 to 73	Wind W. S. W. Clouds with sunshine and wind.	Hibiscus 8 $\frac{1}{2}$ to 4 $\frac{1}{2}$. Anagallis 9 $\frac{1}{2}$ to 2 $\frac{3}{4}$. Oenothera 6 $\frac{3}{4}$ p. m.

	<i>Barom.</i>	<i>Therm.</i>	<i>Weather.</i>	<i>Observations.</i>
Sept. 18.	29 $\frac{2}{10}$	66 to 68	Wind S. W. Covered. Still. Small showers.	Hibiscus 8 $\frac{1}{2}$. Anagallis 10 to 1 $\frac{3}{4}$. Oenothera past 7.
19.	29 $\frac{4}{10}$	63 to 66	Wind E. Covered. Gentle rain in the morning. Very moist all day.	Hibiscus and Anagallis not open. Oenothera past 7.
20.	29 $\frac{2}{10}$	64 to 66	Wind S. S. W. Heavy clouds. Rain at 4.	Hibiscus 9 to 5, only half open. Anagallis 12 to 2 $\frac{1}{2}$, half open. Oenothera 6 p. m.
21.	29 $\frac{1}{10}$	64 to 67	Heavy rain. Clearer at $\frac{1}{2}$ af. 10. Wind W. S. W. Sunshine, with heavy white clouds.	Hibiscus 12 $\frac{1}{2}$ to 6. Anagallis 1 to 2 $\frac{1}{2}$ but never quite open. Oenothera 6 $\frac{1}{2}$.
22.	29 $\frac{1}{10}$	62 to 63	Strong dew. Still E. N. E. Heavy clouds with sunshine. Covered at noon.	Hibiscus 10 to 5, half open. Anagallis 10 $\frac{1}{2}$ to 1 $\frac{1}{2}$, half open. Oenothera after 7.
23.	29 $\frac{4}{10}$	60 to 63	Wind E. Covered.	Hibiscus and Anagallis not open. Oenothera after 7.
24.	29 $\frac{4}{10}$	59 to 61	Wind E. Covered. Still.	Hibiscus and Anagallis scarcely open. Oenothera after 7.
25.	29 $\frac{4}{10}$	59 to 61	Wind E. Covered. Windy. Some rain in the evening.	Hibiscus scarcely open. Anagallis not open. Oenothera 6 p. m.
26.	29 $\frac{4}{10}$	59 to 61	Wind N. E. Windy with rain.	Hibiscus and Anagallis not open. Oenothera after 7.
27.	29 $\frac{6}{10}$	59 to 61	Wind E. Windy. Light clouds with sunshine. Covered at noon.	Hibiscus scarcely open. Anagallis at 11, half open.
28.	29 $\frac{1}{10}$	58 to 59	Wind E. Covered.	Nothing open.
29.	29 $\frac{7}{10}$	57 to 59	Wind N. E. Strong dew. Morning clear, but covered before noon.	Hibiscus not open. Anagallis half open at 11.
30.	29 $\frac{9}{10}$	56 to 59	Wind N. E. Morning clear, af- terwards great white clouds.	Hibiscus 12 half open. Anagallis 11 to 3 quite open.
Oct. 1.	29 $\frac{1}{10}$	55 to 56	Wind N. W. Covered. Sun broke out at noon.	Hibiscus not open. Anagallis 11 $\frac{1}{2}$ to near 2.

After this to the 13th the barometer sunk to $\frac{3}{10}$ and $\frac{1}{10}$. The thermometer varied from 50 to 58. The wind was chiefly W. to W. N. W. The weather was mostly covered and windy. And the flowers did not open.